ANNEX E – RESPONSE SUMMARIES FOR WORST PERFORMING CIRCUITS

There was general agreement among the utility respondents that the advantages of identifying the top worst performing circuits was that it could be helpful in identifying areas on which further analysis might justify corrective action and if corrective action was warranted, the corrective action should improved reliability and customer satisfaction.

However, the respondents noted a number of disadvantages of identifying the top worst performing circuits. Following is a summary of those concerns:

1. Any ranking will result in a worst performing circuit, even if that circuit's overall performance is acceptable. Expenditure of resources to improve a worst performing circuit when its performance is acceptable would be imprudent.

2. The method of identifying the worst performing circuit may not lead to the circuit (or area) that has the greatest opportunity to improve overall reliability or customer satisfaction. Other circuits (or areas), other than the identified worst performing circuit, could actually be experiencing more significant problems or effecting greater number of customers. Focusing on worst performing circuits could result in miss directing time and resources from areas of greater customer benefit.

3. Improving reliability of some worst performing circuits may require significantly more resources than is justifiable due to either the few numbers of customers effected and/or the amount of corrective work required to achieve improvement.

4. There are disadvantages concerning customer perception associated with labeling "worst performing circuits." Customers may develop expectations of a need for improvement because of the labeling of "worst performing circuits." Absent the label of "worst performing circuit," these same customers may have had no expectation for a need to improve reliability. Customers are often accepting of lower levels of reliability giving recognition to their choice of location or other alternatives such as adequate tree clearance or higher rates.

Respondent	**Q1 1. Are there areas of your utility's service territory that are more prone to outages, either sustained or momentary, or other reliability problems, such as power quality, than others? How does your utility address this type of problem?**	**Q.2 What are the advantages of identifying the top worst performing circuits of a utility?**	**Q.3 What are the disadvantages of identifying the top worst performing circuits of a utility?**
Wabash Valley Power Association	Wabash Valley does not keep records of service area related problems. When member system transmission reliability questions arise, we typically ask our transmission provider to compare site specific problems to system averages.	It should direct the utility's operation and/or maintenance activities to these areas on a priority basis.	A mathematical calculation associated with performance may result in an inordinate O&M effort in a limited number of areas.
Jackson County REMC	There are areas in the system that could have a greater potential for longer outage	Could give you an idea where your maintenance dollars need to be concentrated.	Might identify lines that require more maintenance than others, but hard to justify

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	times due to accessibility or circuit configuration (radial vs. loop). We typically attempt to build lines that are accessible at all times when installing new or rebuilding lines. Economics and property owner opposition often prevent this from occurring.		due to number of connected consumers and generated revenue.
Indiana Municipal Power Agency	No response	No response.	No response.
Town of Knightstown	(YES) - WE HAVE UPDATED THE LINES AND CLEARED THE LINES OF TREES.	You can correct the problems.	None.
Tipton Municipal Utilities	1~ We do not have "pockets" of poor service reliability, probably because of size.	We do not have "pockets" of poor service reliability, probably due to size.	Size would make a difference.
Richmond Power & Light Company	The rural areas with long circuit configurations have more exposure and are more susceptible to outages. Also, circuits in areas of dense trees will be more prone to tree and animal related outages. RP&L regularly evaluates system reliability and uses this data to develop capital improvement projects.	Provides measurable data for developing system improvement projects.	Potentially leads to customer perception issues with "worst circuit." Any ranking will result in a worst circuit, even if that circuit's overall performance is acceptable. A customer may express dissatisfaction being served by the "worst" circuit on the system.
Indiana Michigan Power Company (AEP)	Naturally, there are areas where reliability is worse than others. Some circuits will consistently perform worse than others while some will never be listed among the worst performing. The normal fluctuation in annual system values is amplified when individual circuit performance is assessed. AEP considers the performance of circuits over time and focuses attention on circuits that consistently appear in the worst performing group in the implementation of its programs to improve or maintain	The identification of worst performing circuits can be useful to utilities in determining circuits on which detailed engineering analysis of potential circuit improvements is needed and/or justified.	There are no inherent disadvantages in identifying the worst performing circuits. The only real danger is in labeling the circuits "worst performing." Electric utilities should want to know where areas of lesser reliability are located. A disadvantage could exist if there is an expectation that a utility can always significantly or immediately improve the performance of any particular worst performing circuit in a cost effective manner. It also should be noted that customers served from a worst

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	reliability. Even then, recognition as a worst performing circuit can never lead to the control of all outages by the utility. AEP examines the outages on worst circuits, identifies causal factors, considers circuit characteristics, and then decides if facility or operating improvements are justified for the individual circuit. At present, AEP is devoting considerable resources to reliability improvement for customers in the South Bend vicinity. Several pocket areas have specifically been targeted for particular reliability improvement efforts.		performing circuit are not always dissatisfied with their electric reliability. Also, if the worst performing circuits were determined by traditional indices, it is important to recognize that circuit length, load interrupted, and number of customers served would not be considered. For example, based upon index values alone, the circuit serving 50 customers with an annual SAIFI of 2.0 would be improved before the circuit serving 1,000 customers with a SAIFI of 1.9. Utilities consider many factors in developing their work plans.
Marshall County REMC	In general, there are areas where reliability is worse than others and other lines will almost never have problems. Areas with lots of trees have more sustained and momentary outages. Rates only support so much tree clearing and there are a few customers who fight all tree clearing. Weather plays a part also. For example, lightning may or may not follow the same path each year and each storm (wind, sleet, lightning, etc.) may affect different parts of our distribution system as it passes through the area. In an effort to improve system reliability, the MCREMC has a tree clearing program. We rotate contract crews around the system to clear lines. However, some customers refuse to permit any tree clearing. In addition, we spray to control	By identifying the worst performing circuits/lines, a utility is able to review it to determine what improvements are needed and/or justified.	The danger is labeling certain lines "worst performing." REMC's all want to know where their bad circuits are located. However, the utility may not be able to improve the reliability of a circuit/line because of excessive costs compared to revenue available. Even though a line may have a lot of outages, customers are not necessarily unhappy with the utility. They may prefer lower reliability to having adequate tree clearance or a higher rate.

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	brush. We also have a pole testing program and perform various system improvements. Circuits that consistently have reliability problems are reviewed with annual work plans. However, all outages cannot be prevented or controlled.		
NIPSCO	We currently address circuits with relatively higher historical outage history based on our circuit improvement program.	The advantages of identifying circuits through the circuit improvement program are twofold. First, money spent on remedial activity will hopefully produce the biggest return in the form of reliability, and second, this would provide a better opportunity for an improvement in customer satisfaction.	None.
Indianapolis Power & Light Company	Some IPL distribution circuits experience more sustained and/or momentary interruptions than others. The length of the circuit, geographical terrain, tree population, animal habitat, and traffic patterns are all contributing factors. Long circuits and circuits in heavily wooded areas tend to be more prone to sustained and momentary interruptions. Likewise, faulty equipment (i.e. lightning arresters) in certain areas can contribute to this problem as well. Distribution circuits that experience a high number of repeated sustained and/or mome ntary interruptions are identified for analysis and review. A circuit analysis consists of a design and operating review of the entire circuit. Some of the functions performed during a circuit review include line patrol to visually identify problems, infrared testing to identify equipment near	The advantage of identifying and/or reporting the worst performing circuits to the Commission is to assure these circuits are identified and analyzed for corrective action on a routine basis. This should ultimately increase the satisfaction of the customers connected to those circuits and improve overall system reliability. Presently, IPL identifies the top worst performing circuits on our system, determines the root causes of the problems, and implements appropriate corrective action.	The disadvantage of regulatory reporting of the top worst performing circuits is the potential to focus disproportionately more utility attention on those circuits and less on other circuits with other significant problems. Also, generic problems on many circuits may receive less attention and focus, and this could result in lower overall customer satisfaction. It would be unreasonable to expect no variation among the performance of various circuits. Systems are dynamic. If we are not careful, we could find ourselves responding to natural variations in the systems, thus diverting attention from other needy areas, and forcing ever higher standards where they are not justified (by continually responding to the fail of the distribution curve when natural variation would cause different circuits to occupy the tail at various times). Finally, additional reporting requirements may require additional

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	failure, radio frequency interference testing to identify faulty lightning arresters, review of UG cable fault records, and circuit design modeling. A circuit analysis may result in additional circuit maintenance work, installation of additional equipment, tree trimming, load balancing, switching, etc. On the transmission system, protective relay operation records are used to identify and evaluate facilities that are prone to sustained or momentary interruptions. Other than occasional problems caused by roosting birds, there are no real problem areas. Sustained and momentary interruptions on the transmission system are infrequent due to line and substation construction methods and the network configuration of the system. IPL analyzes protective relay operations for correct tripping performance. Corrective actions due to false tripping or other problems may include additional maintenance, equipment replacement and/or system upgrade projects.		manpower.
Logansport Municipal Utilities	Yes. We have areas that attract lightning and tree problems that are always prevalent.	During budget time, we will identify these areas and formulate a plan to reduce or eliminate the problem areas.	Customer perception of problem areas breeds distrust in the utility's ability to serve their customers.
Vectren Energy Delivery	Yes, there are areas of the electric service territory that are more prone to service problems than others. Vectren implemented a new GIS-based Outage Management System ("OMS") in	Circuit-level reliability performance is captured by nearly all utilities, and can be used as an indicator of poor performing "pockets" of circuitry contained within the circuit coverage area.	Vectren's experience has shown that using circuit-level reliability performance to indicate "pockets" of reliability problems can be misleading. Vectren typically has between 800-1200 customers serviced by one 12.47 KV circuit. As referenced in

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	November of 2001 and has spent the majority of 2002 refining reporting and processes to integrate the new system. The following discussion addresses this issue before the new OMS and how Vectren plans on using the new system. 1. Before PowerOn OMS: Prior to implementing the PowerOn OMS, Vectren would locate these problem areas utilizing one or more of the following methods: a. Reviewing worst performing circuits by manually locating the protective devices that operated over a specific time period and reviewing the details of each operation to determine the best method of addressing any problem areas encountered. b. Generated reports from the Trouble Call Outage Management (TCOM) database sorted by address to locate small areas within a circuit's coverage area experiencing reduced levels of service. A review of the details of each operation then took place to determine the best method of addressing the problem. c. Reviewing details of customer inquiries concerning reduced service quality to determine the nature of the concern and a remedy if possible. 2. After PowerOn OMS: Vectren can continue to perform items 1a and 1c above; however, item 1b above		question #2 above, an entire circuit with poor performance can certainly be an indicator of poor performing "pockets" contained therein. However, one can also have 12.47 KV circuits with a relatively good overall performance that still contain "pockets" of poor performing circuitry. By reviewing performance at the protective device level and the customer level, more effective reliability improvement objectives can be targeted. However, this type of information is difficult to obtain without a fairly robust Outage Management System.

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	will be replaced by items 2a and 2b described below. Vectren continues to refine the reporting capabilities available from the historical tables contained within PowerOn. The following reporting concept has not been implemented but will serve as a reference to the additional capabilities offered by the new PowerOn OMS: a. Vectren can write reports that summarize reliability information by individual customers experiencing service problems and sort the report by worst level of performance to best. This report principally will access the "Customer Interaction Archive" table contained within PowerOn's historical database. This table contains the related field entitled "Outage ID" that relates the individual customer service levels back to the individual service problems the customer experienced. b. Vectren can write reports that summarize reliability information by the individual protective device that operated and sort the report by the most frequently operating device, or some combination of frequency of operation, and number of customers impacted. This report principally will access the "Outage Device Archive" table contained within PowerOn's historical database. This table contains the related field entitled "Outage ID" that relates the individual protective devices that operated back to the individual service problems that caused the		

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	operation of the device.		
Edinburg Municipal Utilities	Yes: ~Reclosures are installed if we have a problem area, which will cause the momentary outage power to come back on.	Better customer relations by solving the problem.	Bad complaints by customers, more cost to the utility for overtime.
Harrison REMC	Circuit configuration (loop vs. radial), route of the line, number of trees, etc. all makes a difference in reliability, blinks or overall power quality. Anytime we are having problems we patrol the area and try to find the root cause.	Identifying these areas helps determine where maintenance or upgrades need to be done.	While this may show you where problems are, it may not show areas they could get more customers helped for the same amount of money.
PSI/Cinergy	Rural areas tend to be more prone to outages than urban areas. This is true for momentary and sustained outages. Network configurations in major cities have much fewer outages. Since a majority of power quality problems originate in customer buildings, power quality problems tend to depend more on building owners than service territory. PSI monitors individual circuit performance and individual device performance on distribution circuits to identify repeating outages that would indicate which areas are more prone to sustained and momentary outages.	Identifying the worst performing circuits sometimes helps identify reoccurring problems that would otherwise go undetected.	Identifying the top worst performing circuits may not provide useful information. First, it is often difficult to accurately determine if the worst performance is a consistent problem, due to a concentration of weather events, or just a valid statistical variation from year to year. Second, it is difficult to account for variations in configuration between circuits. Third, it may not be the most efficient method of managing overall reliability. PSI has observed significant changes in relative ranking among circuits simply because of random outage events.
Frankfort City Light & Power	Our rural areas and those areas involving large volumes of trees are more susceptible to outages. Constant review of these problem areas is noted, and monies allocated when possible to improve service.	Provide ongoing information regarding service reliability.	Customer perception.

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Crawfordsville Electric Light & Power	CEL&P does not have any particular area that is more prone to outages or other reliability problems than others	The advantage to identifying the top worst performing circuits is to further scrutinize those circuits to determine methods for improving their reliability, and to apply this knowledge to other areas as well.	The disadvantage of identifying the top worst performing circuits of a utility are customer perception they are not being treated fairly, and the possibility the utility may spend a disproportionate amount of time and resources on these circuits.
Indiana Industrial Group	No response	No response.	No response.
Anderson Municipal Light & Power	Yes tree related areas. Circuits in areas of dense trees will be more prone to tree and animal related outages. AML&P evaluates system reliability and uses this data to develop capital improvement projects.	To provide information as to the cause, and develop a maintenance or capital improvement plan to monitor system outages.	The disadvantages of identifying the worst performing circuits of a utility would be if the circuit having the most problems fall within the written guidelines provided by the Commissioner or IEEE. This would send a message to the customer they are being served by the worst part of the system when in reality they are not.
Northeastern REMC	Every utility has areas that are, from time to time, more prone to outages. We try to find the root cause and correct the problem. We will patrol these areas, change circuit configuration, improve coordination, install lightning protection, trim trees, install animal protection, convert overhead to underground or rebuild as needed.	We can better focus on the problem areas.	The worst area that may be identified may not be the best area to focus on. There may be another area that more consumers will benefit from the limited amount of funds that may be available for upgrades or maintenance.
Mishawaka Utilities	NO	Identifying the "worst performing circuits" provides utility management information so reserves can be appropriately focused.	There are no disadvantages to identifying the "worst performing circuits," as the methodology for determining the worst performing circuits takes into account the impact the circuit outages have on our customers.
Washington Municipal Utilities	No. Update the equipment.	Less outages.	N/A
Lawrenceburg Municipal Utilities	No.	Advantages are having information to direct resources to the areas of need.	There are no disadvantages.